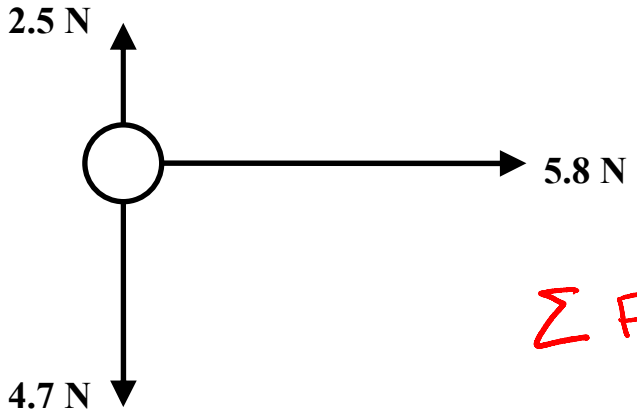
Example #4. These three forces act on a ball, as shown. Find:

a) the unbalanced force on the ball;

b) the force that needs to be added to cause the ball to be in equilibrium.

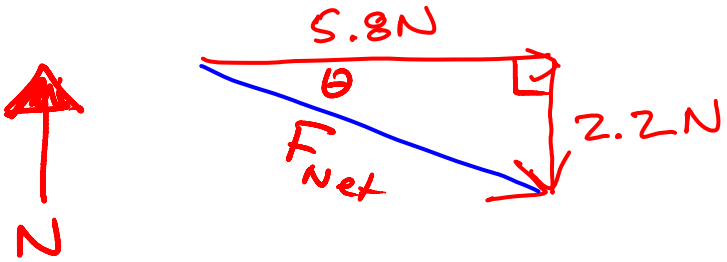


→ examine ΣF_x and ΣF_y :

$$\Sigma F_x = 5.8\ N$$

$$\Sigma F_y = 2.5 + (-4.7) = -2.2\ N$$

a) Use vector addition:

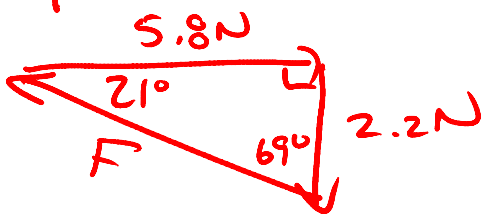


$$F_{Net} = \sqrt{5.8^2 + 2.2^2} = 6.2\ N$$

$$\theta = \tan^{-1}\left[\frac{2.2}{5.8}\right] = 21^\circ$$

$$\Rightarrow \boxed{F_{Net} = 6.2\ N,\ 21^\circ\ S\ of\ E}$$

b) Equilibriant is opposite to F_{Net}:



$$\boxed{F = 6.2\ N,\ 69^\circ\ W\ of\ N}$$